

FIG. 1(a)

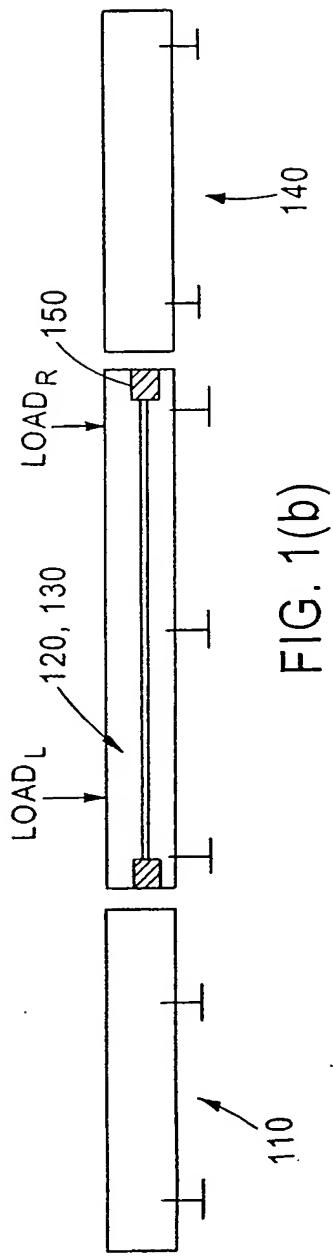


FIG. 1(b)

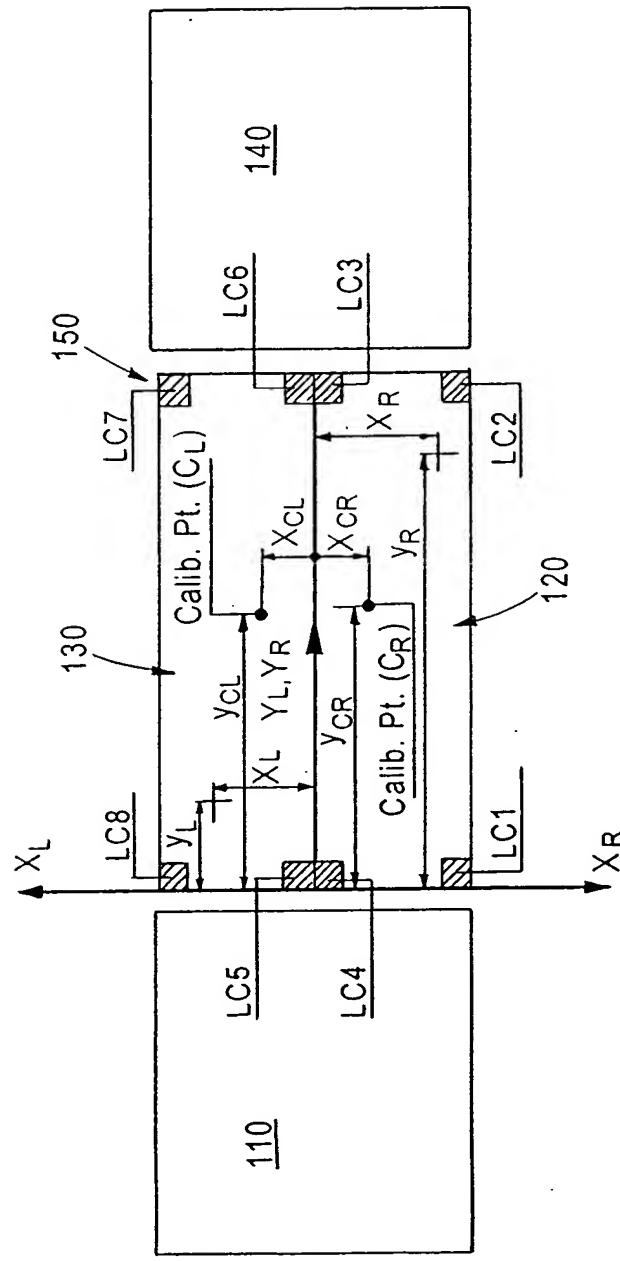


FIG. 1(c)

Table 1. A sample of an YYMMDDxxx.ID file

Time	File running number YYMMDDxxx	Cow's Transponder	Cow's Number	Number of cows per file (n)
14:24:18	020527020	18276	199	2
14:24:18	020527020	17112	1027	
14:28:13	020527021	17212	961	4
14:28:13	020527021	17225	217	
14:28:13	020527021	18231	980	
14:28:13	020527021	15293	1026	
14:33:18	020527022	20756	991	3
14:33:18	020527022	23221	213	
14:33:18	020527022	25260	885	

Figure 2

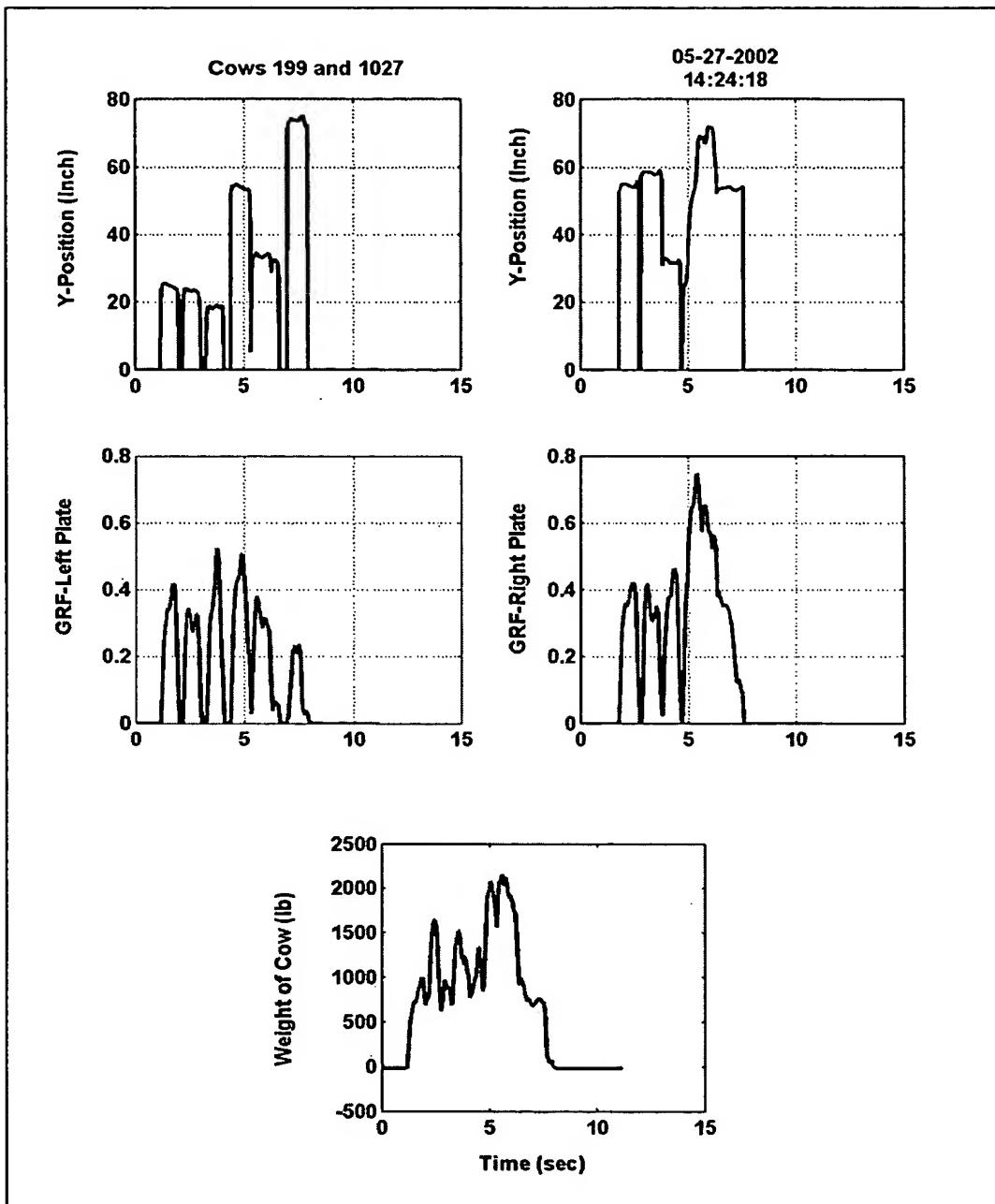


Figure 3

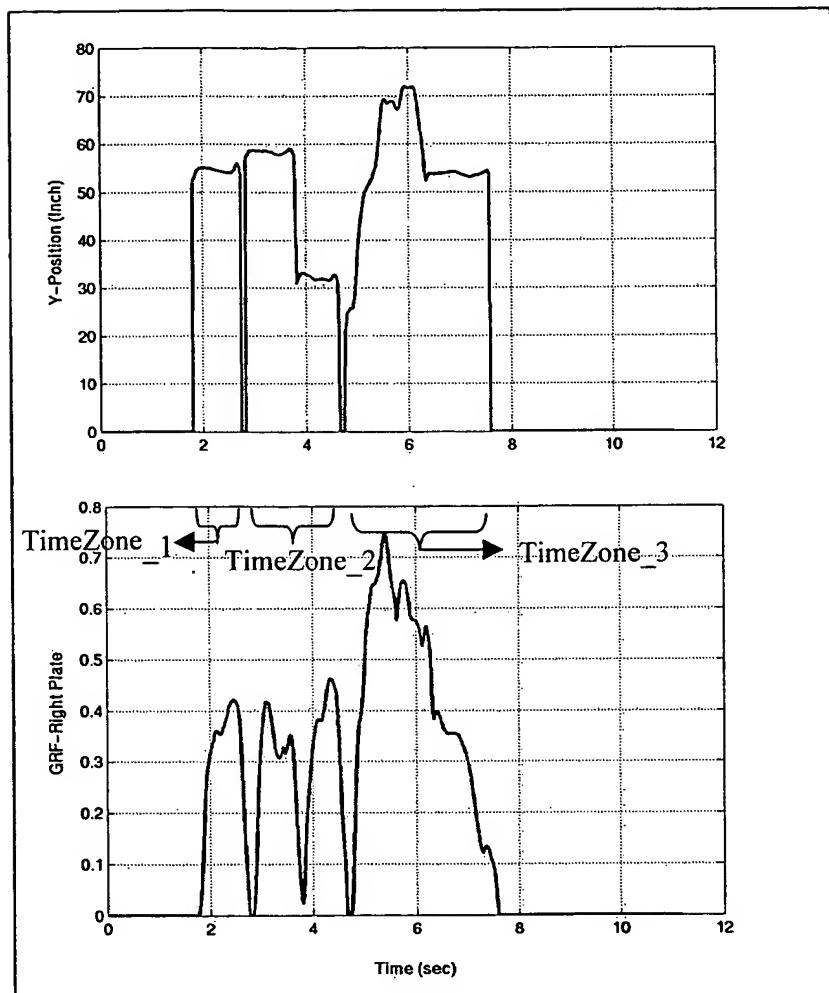


Figure 4

Table 3. Definitions of the statistical parameters evaluated in each TimeZone. The parameters are based on Y position and GRF values.

LimbZoneStatistics	Description
Yave	Average value of Y position
Ymax	Maximum value of Y position
Ymin	Minimum value of Y position
YSLOPEmax	Maximum Y position slope
tYSLOPEmax	Time at which maximum Y position slope occurs
YSLOPEmin	Minimum Y position slope
tYSLOPEmin	Time at which minimum Y position slope occurs
PGRF	Peak Ground Reaction Force
AGRF	Average Ground Reaction Force
GRF_pos_SLOPE	Counter of positive GRF slopes
GRF_neg_SLOPE	Counter of negative GRF slopes
Delta_GRF_SLOPE	The number of times GRF changes its slope from positive to negative
J_Limb	Number of limbs in a time zone

Figure 5

Table 3. Numerical values of LimbZoneStatistics for the data plots shown in Figure 4. TimeZone_1 reflects a single limb ($J_{\text{Limb}} = 1$), TimeZone_2 reflects 2 limbs ($J_{\text{Limb}} = 2$), and TimeZone_3 reflects 3 limbs ($J_{\text{Limb}} = 3$)

LimbZoneStatistics file 020527020	TimeZone_1	TimeZone_2	TimeZone_3
Yave	54.58	45.99	56.40
Ymax	55.05	59.10	71.91
Ymin	53.99	30.96	25.49
YSLOPEmax	0.98	2.10	14.28
tYSLOPEmax	2.54	3.82	4.97
YSLOPEmin	-0.36	-28.03	-10.56
tYSLOPEmin	2.18	3.72	6.23
PGRF	0.42	0.46	0.75
AGR	0.36	0.32	0.46
GRF_pos_SLOPE	0	1	73
GRF_neg_SLOPE	0	14	26
DeltaGRF_SLOPE	3	7	9
J_{Limb}	1	2	3
LimbSequence	F	-	-

Figure 6

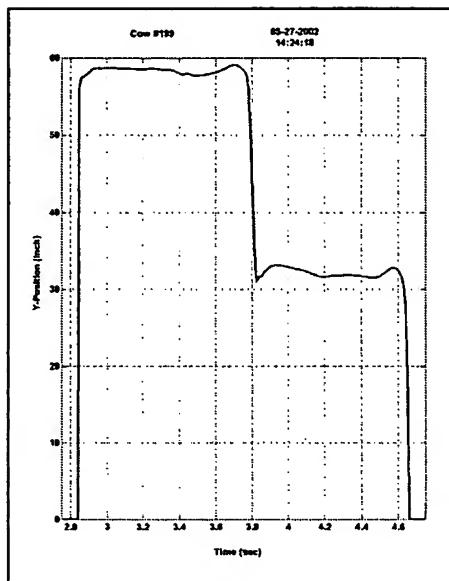


Figure 7(a)

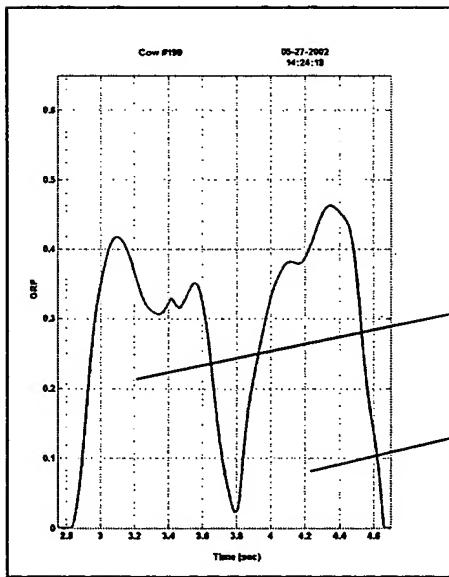


Figure 7(b)

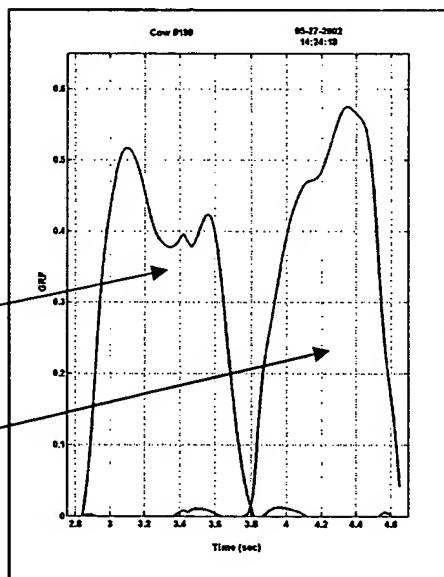


Figure 7(c)

LimbZoneStatistics for file 020527020 (n=2)	1 st Animal Cow 199		(n-1) animals Cow 1027	
	Time Zone_1	Time Zone_21	Time Zone_22	Time Zone_3
Yave	54.58	58.40	32.14	56.40
Ymax	55.05	58.40	32.14	71.91
Ymin	53.99	58.40	32.14	25.49
YSLOPEmax	0.98	0.73	1.01	14.28
tYSLOPEmax	2.54	3.55	4.45	4.97
YSLOPEmin	-0.36	-0.63	-0.82	-10.56
tYSLOPEmin	2.18	3.32	4.06	6.23
PGRF	0.42	0.42	0.47	0.75
AGR	0.36	0.35	0.39	0.46
GRF_pos_SLOPE	0	0	0	73
GRF_neg_SLOPE	0	0	0	26
DeltaGRF_SLOPE	3	5	1	9
J_Limb	1	1	1	3
LimbSequence	F	H	F	-

Table 4: TimeZone_2 (Table 3) is a two limb zone (J_Limb=2) and the TwoLimbSeparation function is called to convert TimeZone2 into TimeZone_21 and 22. The limb zone statistics are calculated for the two separated time zones and the LimbSequence

Figure 8

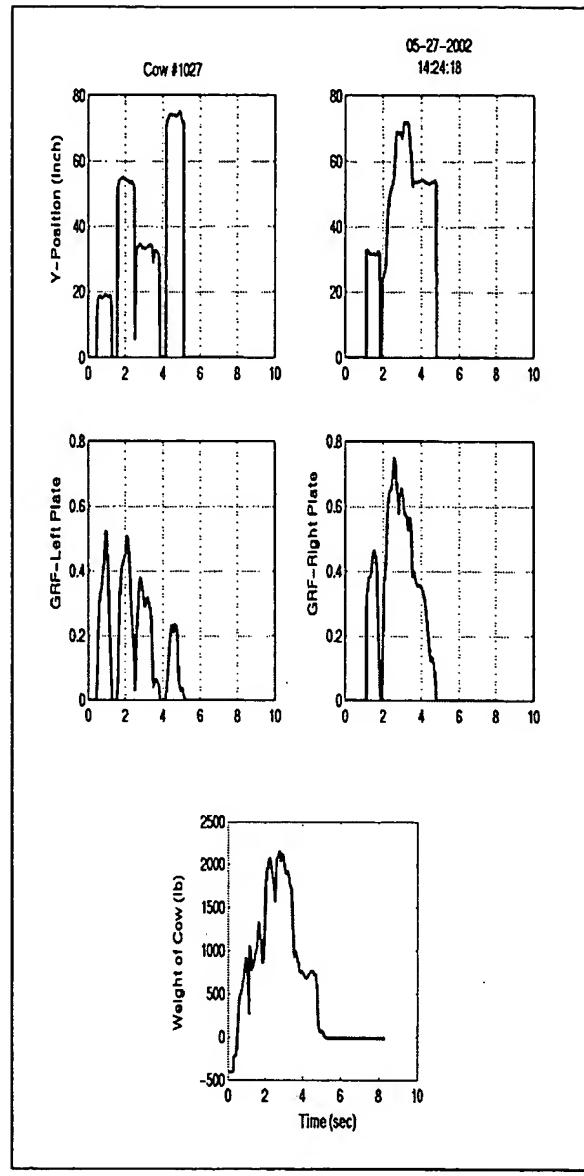
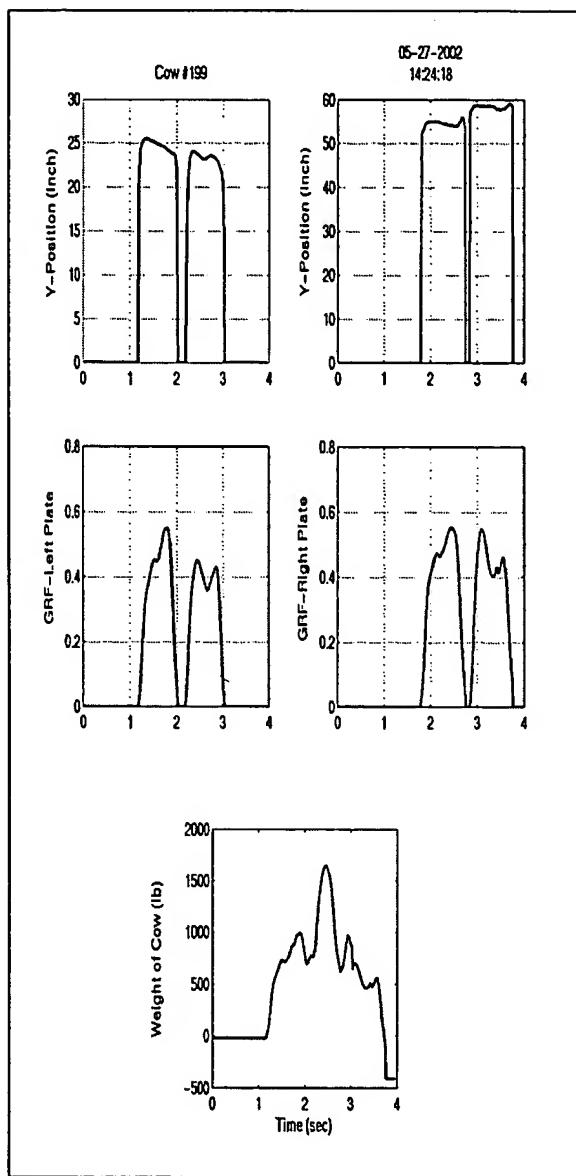


Figure 9(a)

Figure 9(b)

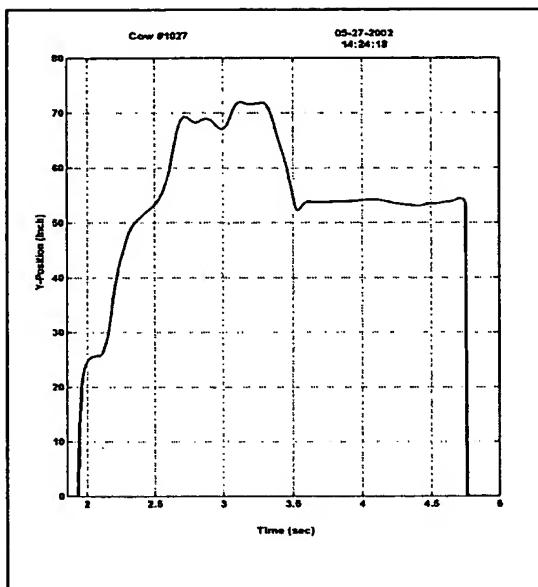


Figure 10(a)

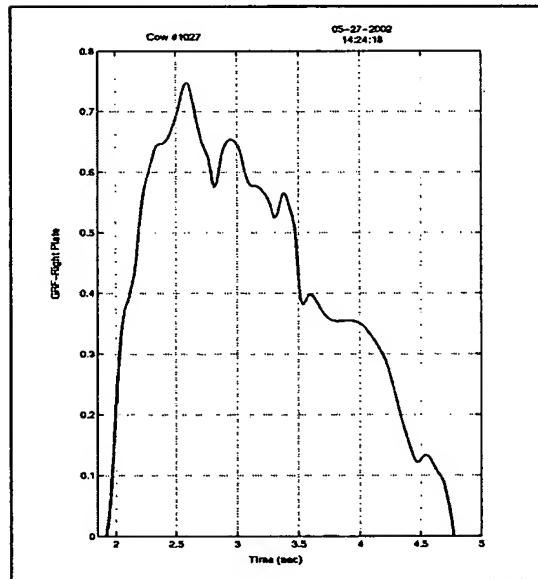


Figure 10(b)

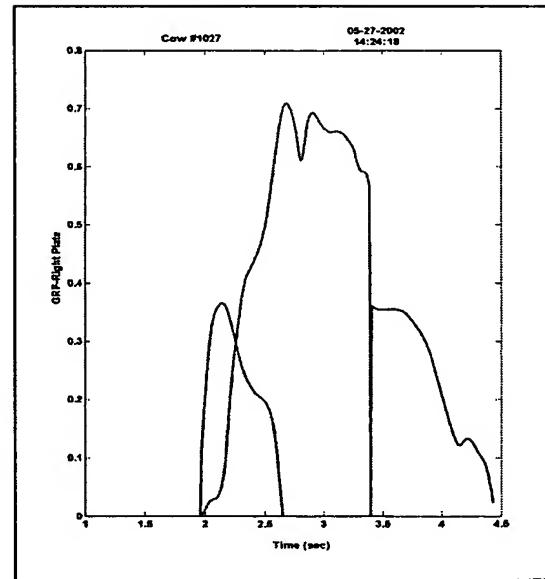


Figure 10(c)

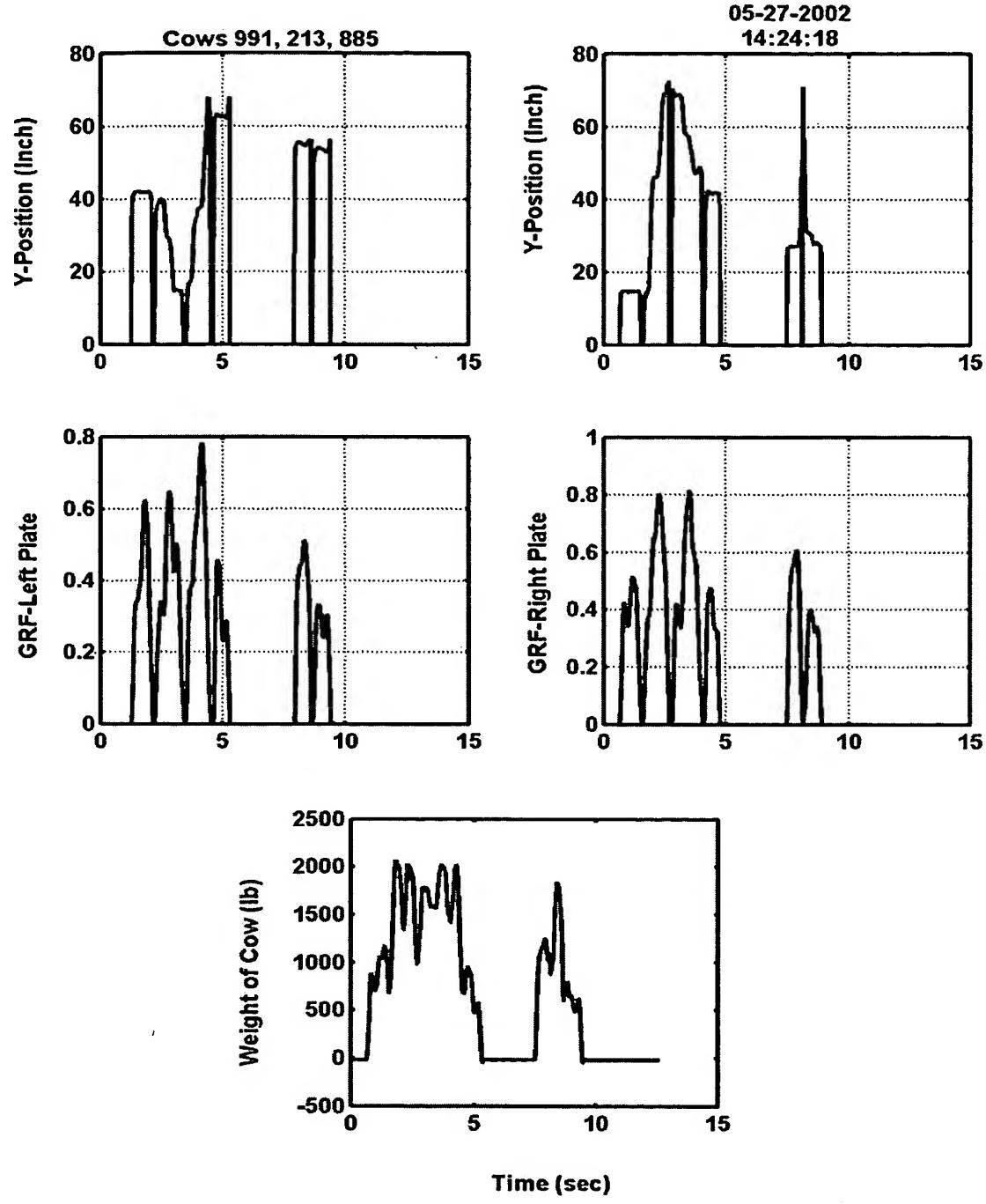


Figure 11(a)

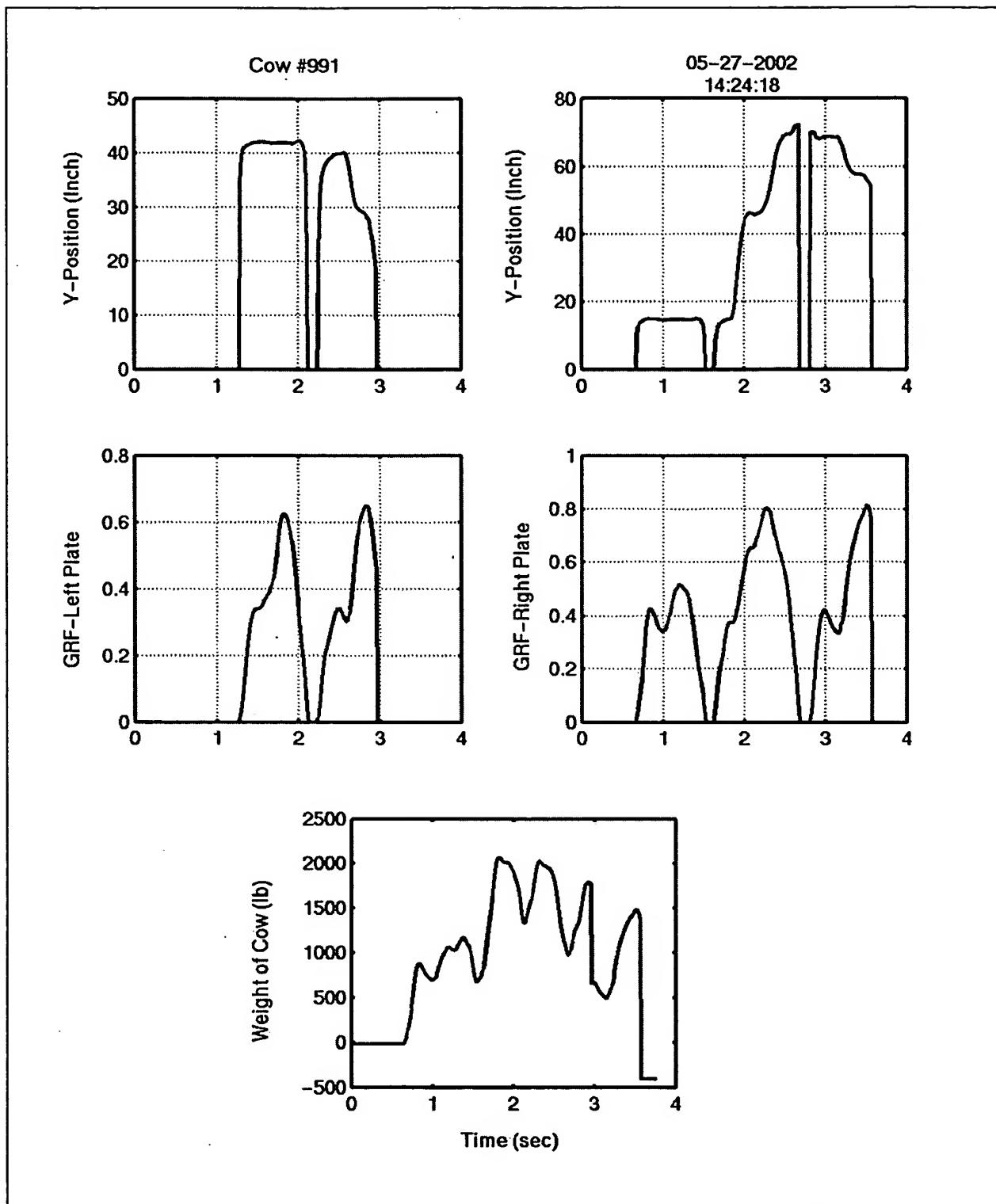


Figure 11(b)

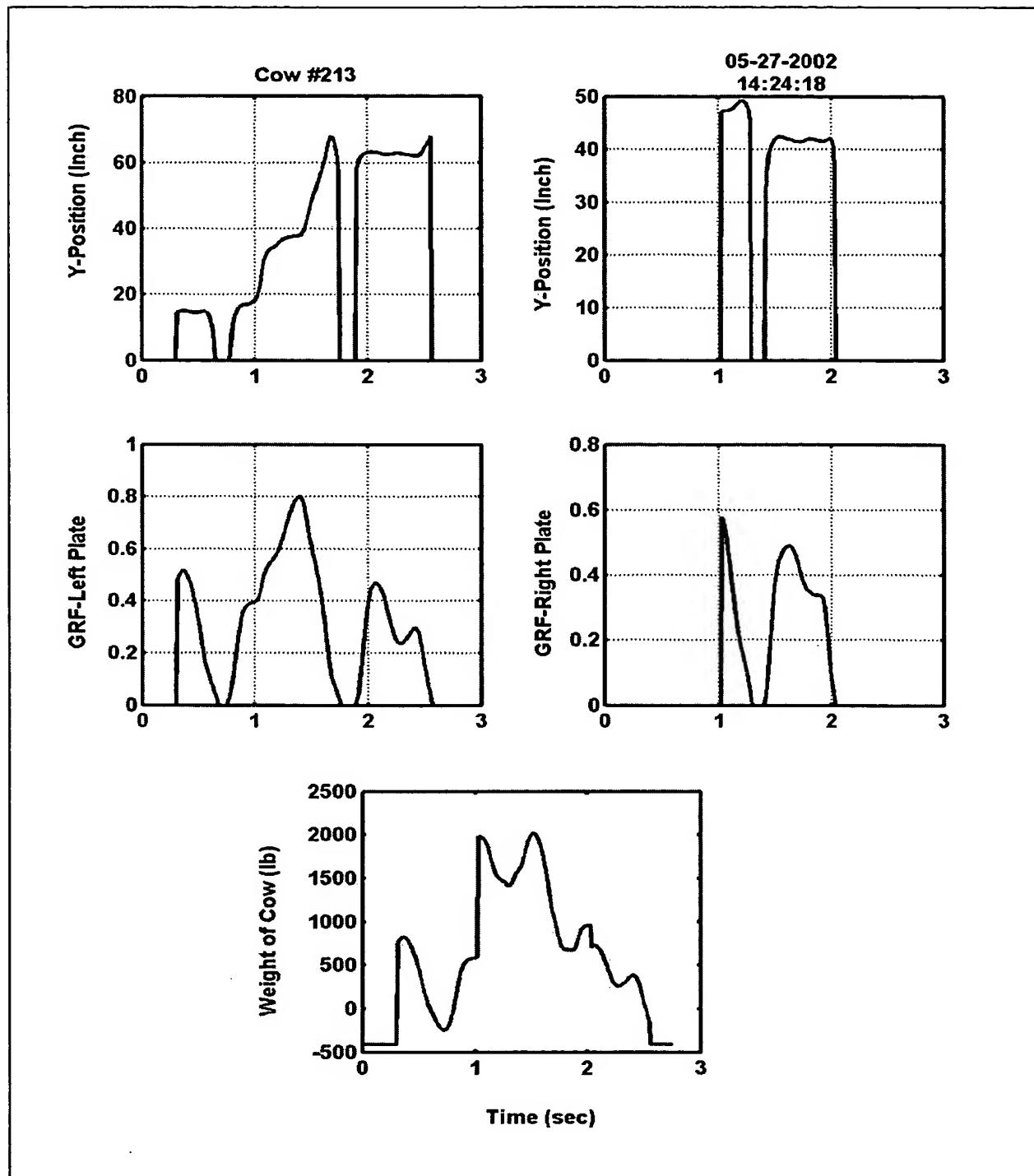


Figure 11(c)

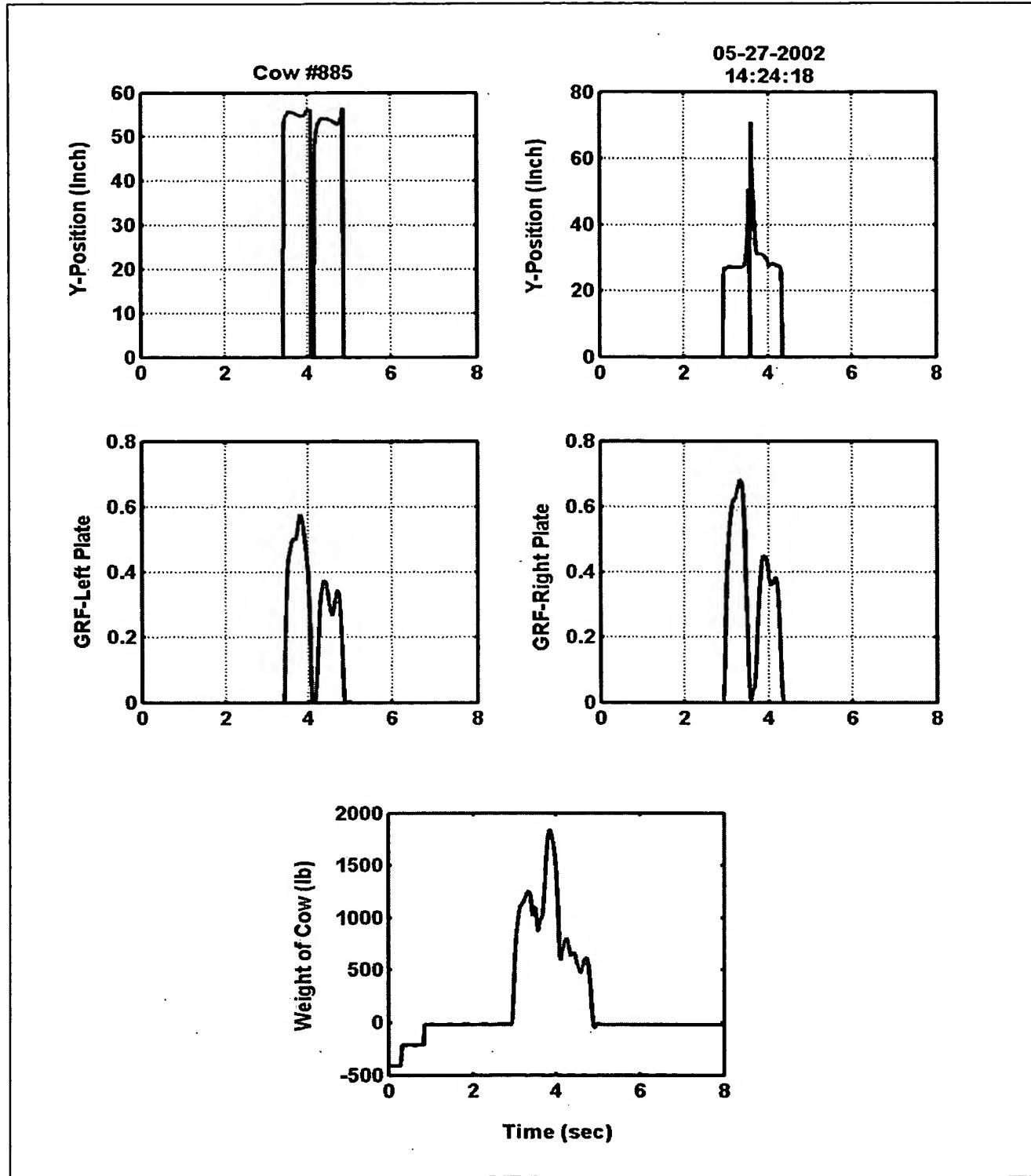


Figure 11(d)

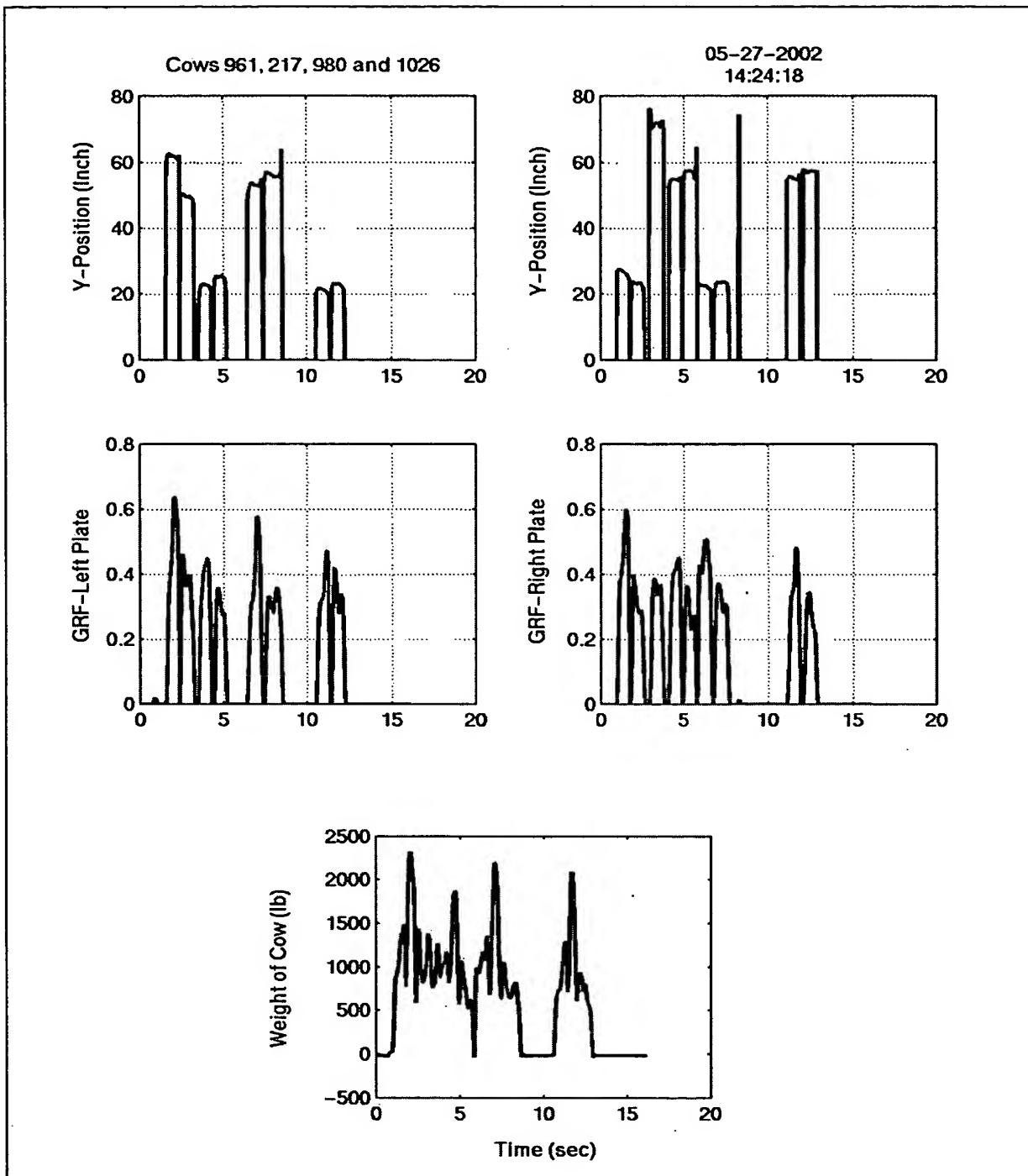


Figure 12(a)

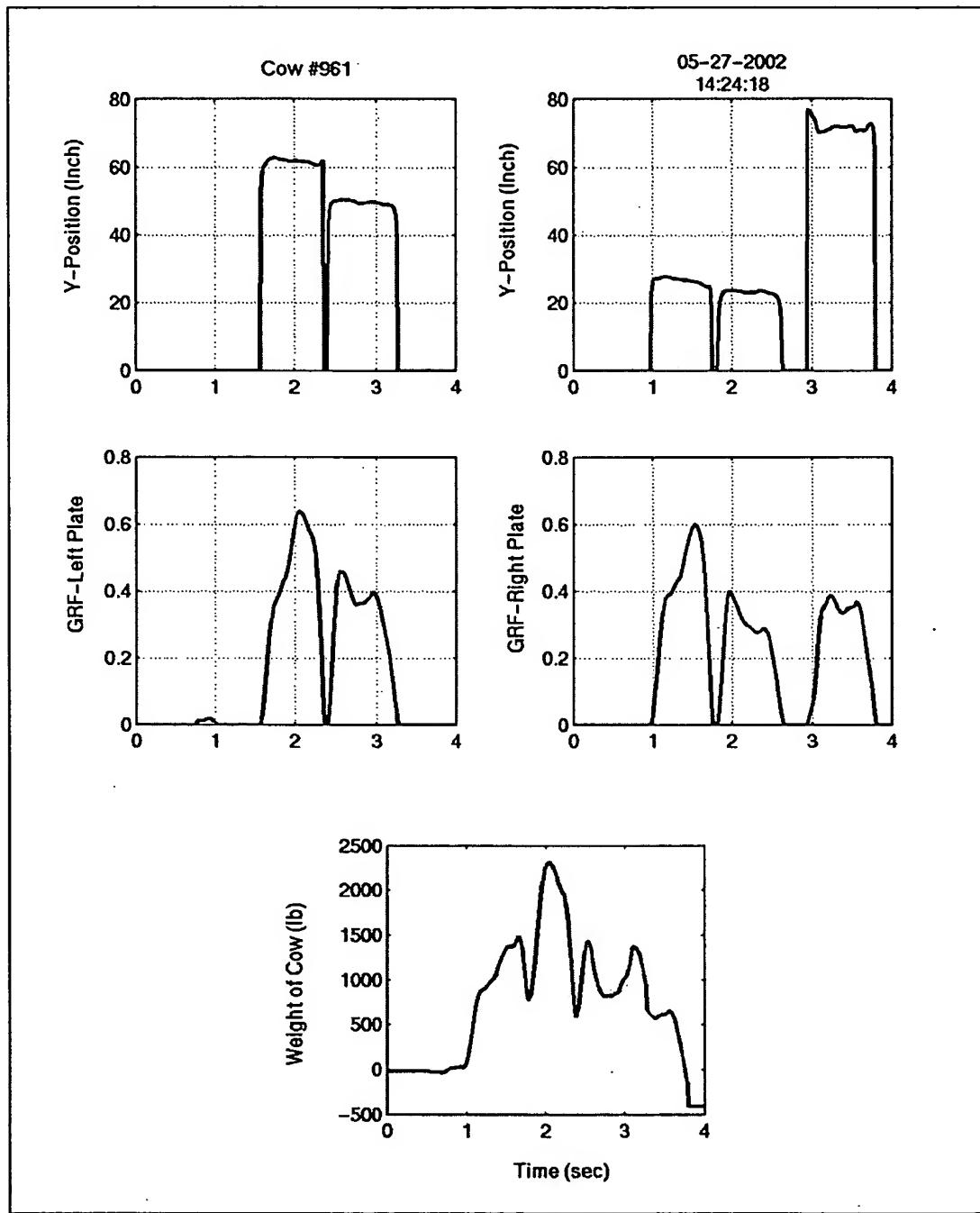


Figure 12(b)

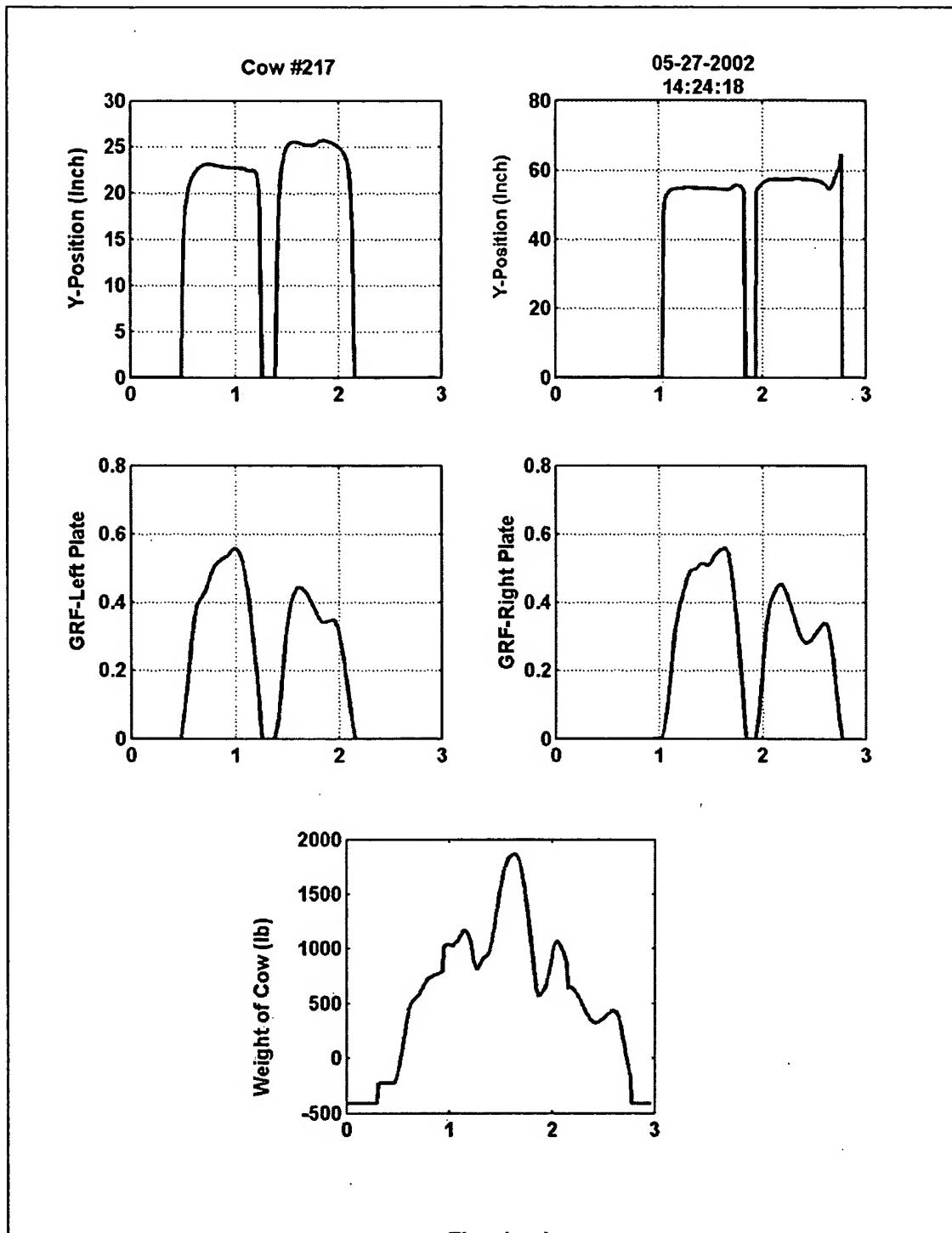


Figure 12(c)

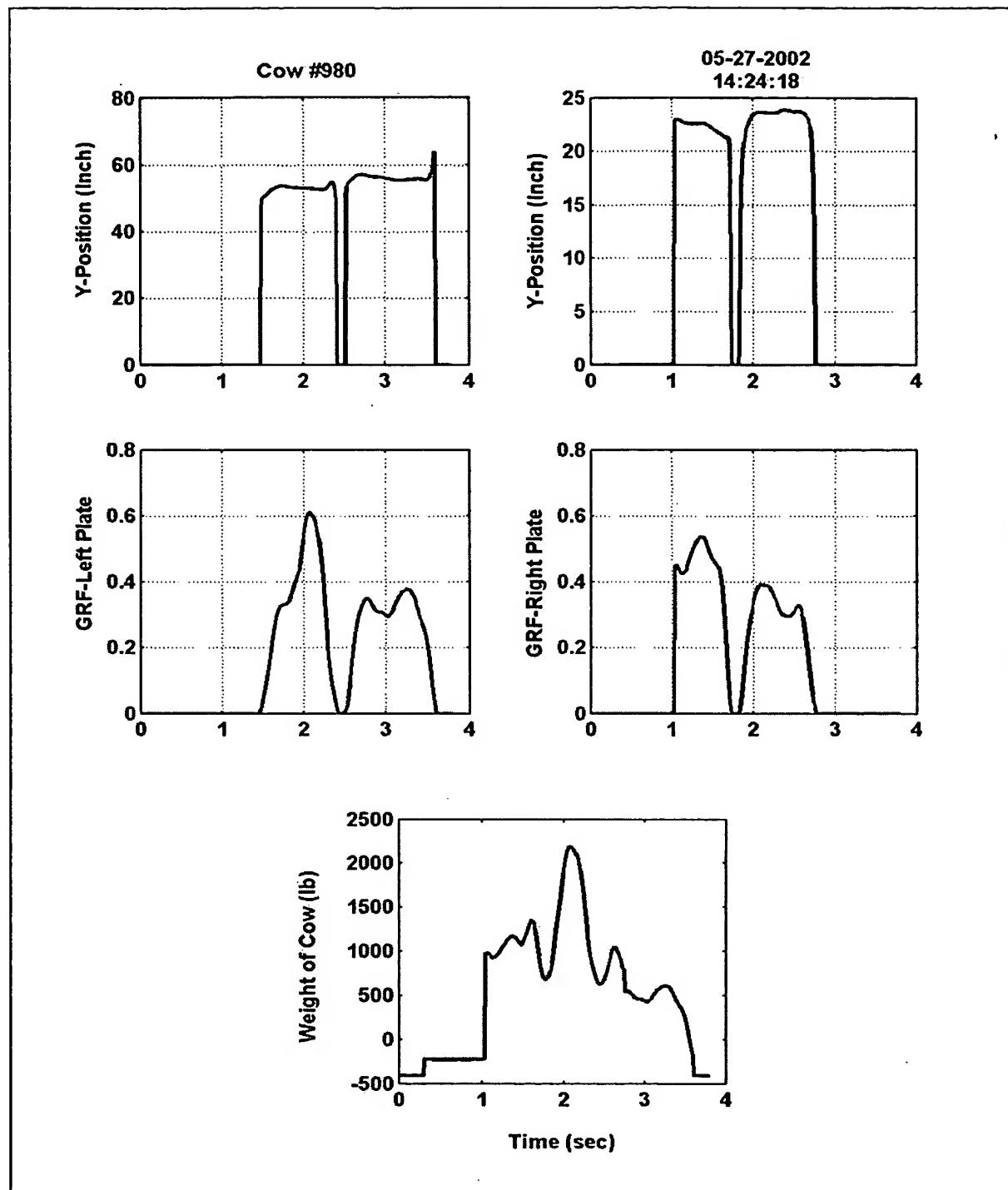


Figure 12(d)

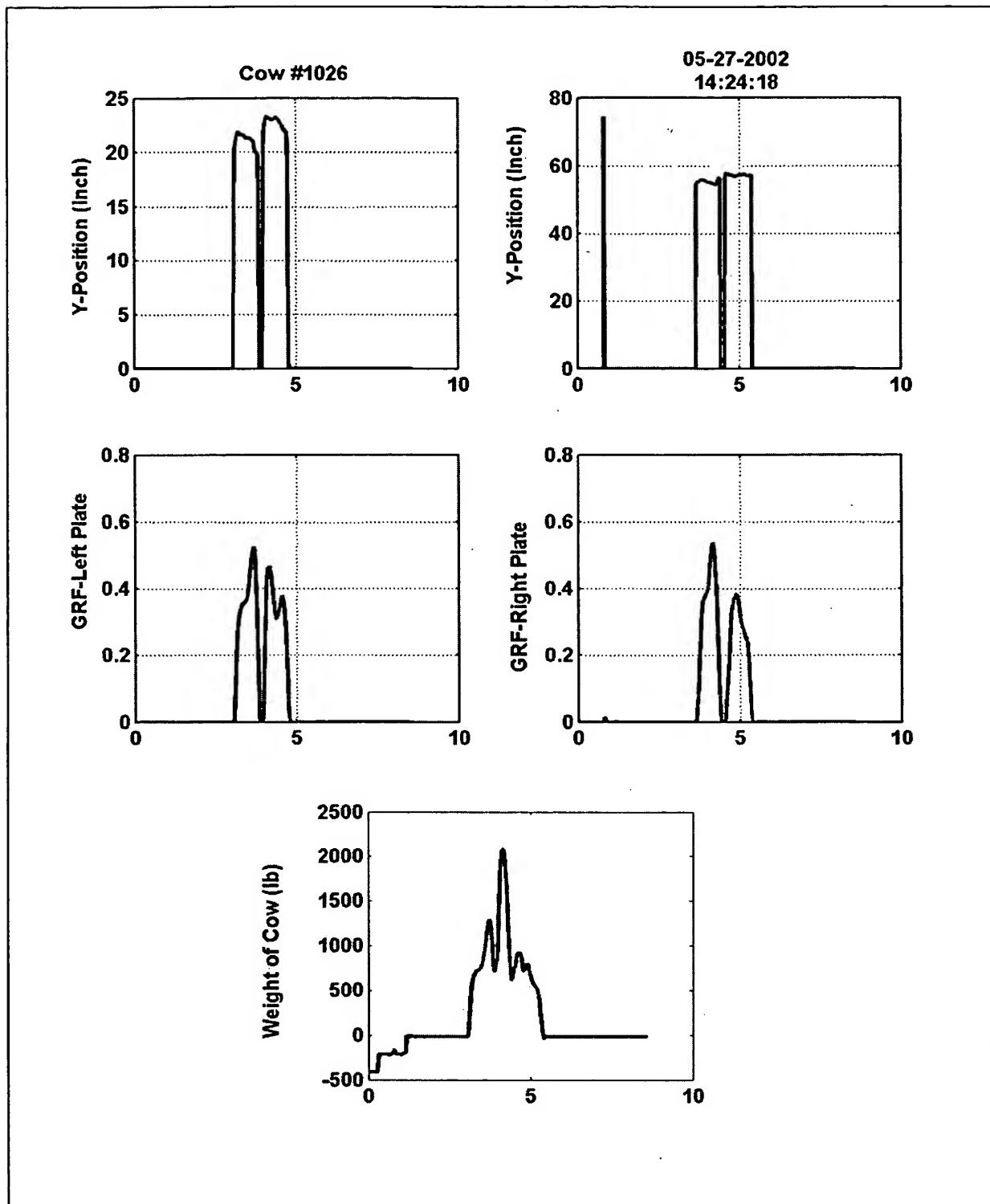


Figure 12(e)

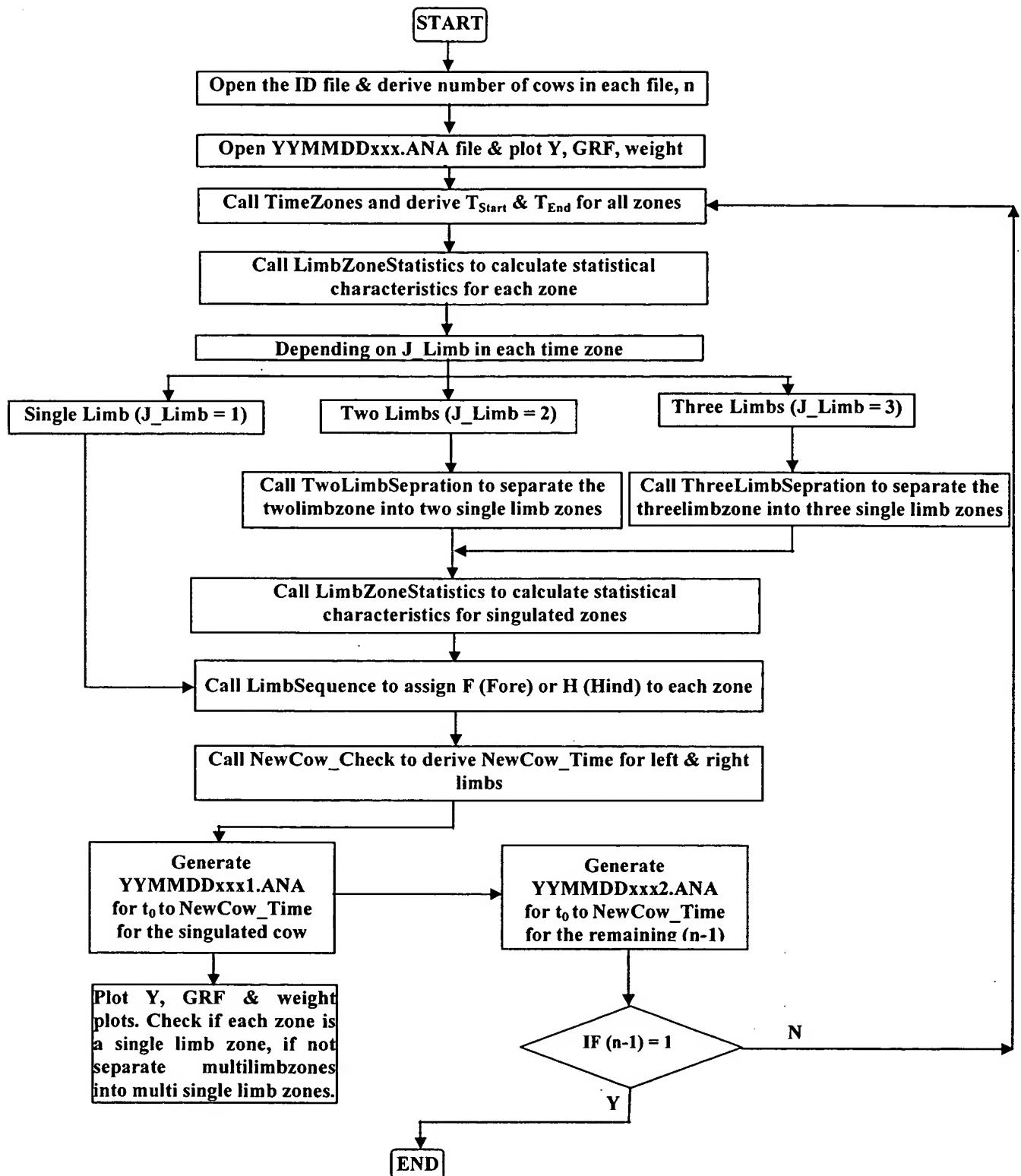


Figure 13